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Real Time Dynamics At Large N

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The lattice formulation of finite-temperature field theory is readily extended, via the Schwinger-Keldysh contour, to accommodate the definition of real-time observables. Unfortunately, this extension also induces a maximally severe sign problem, obstructing the computation of, for example, the shear viscosity. In the large- N limit of certain field theories, including $O(N)$ -symmetric scalar fields, observables can be computed via a saddle point expansion (closely connected to the Lefschetz thimble programme for alleviating the fermion sign problem). This expansion continues to work for real-time observables. In this talk we present lattice calculations of real-time dynamics in scalar field theory at large N , both near equilibrium (transport coefficients) and far from equilibrium.

Primary author: LAWRENCE, Scott (University of Colorado, Boulder)

Presenter: LAWRENCE, Scott (University of Colorado, Boulder)

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